

REMARKS

Claims 1-20 are now in the application. No new matter has been added by this Response. Reconsideration and prompt allowance of the pending claims are respectfully requested in light of the following remarks.

Experimental Report

In the previous response to the March 5, 2008 Office Action, Applicants submitted an Experimental Report, which sets forth the pH value of a 10% strength aqueous suspension of a catalyst in accordance with the applied citation to Sauer. For the convenience of the Examiner, a copy of this Experimental Report is attached to this Response. The Experimental Report was originally entered into the record on September 4, 2008, as evidenced by the PAIR internet site of the U.S. Patent and Trademark Office for this application.

Response to Office Action

Claims 1-20 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,852,219 to Sauer et al. in view of the article "Activity of Tungstate Catalysts in the Synthesis of Methyl-Mercaptane [sic] from Methanol and Hydrogen Sulfide," to Mashkina et al., Reaction Kinetics and Catalysis Letters (1988), 36(1), 159-164.

Claim 1 recites, among other features, that the pH of the catalyst, measured on a 10% strength aqueous suspension, is in the range from 5.0 to 9.7. At least this feature of independent claim 1 cannot reasonably be considered to be suggested by Sauer or Mashkina.

Neither applied citation indicates what pH would be obtained with a 10% strength aqueous suspension of the catalysts suggested therein. Applicants herewith resubmit an Experimental Report, which measures the pH of a catalyst corresponding to the catalyst suggested in Sauer, on two very similar support materials, which corresponds to comparative example 1 discussed in Applicants' disclosure. As set forth in the Experimental Report, the

comparative example results in 10% strength suspensions having a pH of 9.8 or 9.9, respectively, which is outside the range recited in claim 1.

Applicants claim a catalyst, i.e., a product, that is more selective, provides for a higher yield, and can be operated closer to the stoichiometrically balanced ratio of 1:1 than the catalyst suggested in Sauer. The superior properties are discussed in more detail below. The Office Action, at page 5, first paragraph, however, asserts that varying the pH as a process parameter is not a patentable distinction. This assertion ignores that the claimed catalyst is distinguishable from Sauer as is evidenced by the claimed catalysts' chemical properties, such as the pH of a 10% dispersion. Accordingly, a skilled artisan can readily assess whether or not a catalyst, comprising the combination of all of the other features of claim 1, falls within the claim scope by measuring the pH of a 10 % dispersion.

The Office Action further asserts, at page 5, second paragraph, that an "undiluted catalyst" has a different pH than a 10% aqueous suspension. The measurement of the pH, i.e., the negative decimal logarithm of the hydrogen ion activity in an aqueous solution," of an "undiluted catalyst," i.e., a solid, poses some interesting analytical challenges; these challenges, however, are not relevant here, nor is the pH of an aqueous suspension of a catalyst at a strength different from 10% . The metes and bounds of claim 1 can be determined by the measurement of the pH of a 10% strength aqueous suspension. As evidenced by the enclosed Experimental Report, the catalysts suggested in Sauer are outside the scope of claim 1.

Applicants note that the applied citations in the Office Action were already relied on the previous Office Action of March 5, 2008. Applicants responded to that Office Action in the September 4, 2008 response by providing an Experimental Report, highlighting the distinctions over the applied citations, discussing the superior results of the claimed catalysts and stressing the criticality that a catalyst as claimed can operate closer to a 1:1 ratio of methanol and hydrogen sulfide, the starting materials in the production of methyl mercaptan. The Office Action does not address any of Applicants' arguments, yet at page 5, line 4, the Office Action indicates a showing of criticality can demonstrate patentability. As such, the Office Action fails to meet the burden of answering all asserted advantages set forth in the September 4, 2008

Response. Specifically, as set forth in MPEP §707.07(f) “[i]f it is the examiner’s considered opinion that the asserted advantages are not sufficient to overcome the rejection(s) of record, he or she should state the reasons for his or her position in the record.” The Office Action did not meet this burden.

Applicants demonstrated in the Experimental Report that an aqueous solution of the catalyst of comparative example 1 discussed on page 7 of Applicants’ disclosure has a pH of 9.8 whereas aqueous solutions of the three catalysts as claimed have pH values in the range of 6.0 to 8.2. Further, the catalysts as claimed achieve surprisingly high selectivities and yields in the preparation of methyl mercaptan compared to comparative example 1.

The Office Action, at page 4, first full paragraph, asserts that Sauer suggests a process wherein the pH is 8-14 and Mashkina suggests a catalyst system wherein the pH is 3.3 to 7.0. The Office Action does not indicate where in Mashkina a catalyst system with a pH of 3.3-7.0 is found. However, nowhere in the entire citation does Mashkina indicate the pH of a 10% strength aqueous suspension. Mashkina does suggest, at page 162, third paragraph, pH values for the polycondensation of WO_4^{2-} . As such, Mashkina suggests pH values in the preparation of the catalysts disclosed therein. These pH values do not correspond to the pH values of an aqueous suspension of final catalyst.

Like Sauer, Mashkina does not disclose the pH of a 10%-strength solution of the catalysts suggested therein. A sample of a catalyst according to Mashkina was not readily available. However, as set forth on page 2, lines 34-36, of Applicants’ disclosure, the catalysts of the related art, such as Mashkina and Sauer, are still in need of improvement with regard to the selectivity and activity and economical process conditions. Accordingly, the catalysts suggested in Mashkina do not provide all of the associated benefits achievable by a catalyst as recited in claim 1.

Further, Mashkina describes the activity of various catalyst for the synthesis of methyl mercaptan from methanol and hydrogen sulfide with catalysts produced by impregnating Al_2O_3 with tungstates. Although some modeling studies on the condensation behavior of tungstates in

solution are described on page 162, third paragraph to page 163, first paragraph, Mashkina does not recognize that the pH of an aqueous suspension of the catalyst is a result-effective variable. Quite to the contrary, Mashkina states right at the beginning at page 159, lines 1-4, that the catalysts suggested therein all have approximately the same activity regardless of the degree of condensation of the tungstates applied, and, therefore, regardless of the pH of the impregnation solutions.

In addition, a catalyst as recited in claim 1 achieves superior results over the catalysts suggested in Mashkina. Examples 6 and 7 of Mashkina, having a similar material composition to a catalyst as claimed, display a selectivity to methyl mercaptan of 83 and 86%, respectively. In contrast, the selectivities of the claimed catalysts, such as examples 2-4 in the table of page 7 of Applicants' disclosure, achieve superior selectivities of 88-89% at a significantly improved yield compared to the comparative example 1.

Further, as set forth on page 3, lines 1-2, of Applicants' disclosure, it is a critical feature of the claimed catalyst to perform well while the ratio of hydrogen sulfide to alcohol deviates only slightly from one to reduce the energy consumption required. The performance test described on page 7 demonstrates that the claimed catalyst achieves superior selectivities and yields at a molar ratio of hydrogen sulfide to methanol of 1.9 mol: 1.5 mol, i.e., a ratio of approximately 1.27, whereas Mashkina requires, in Table 1 on page 161, a ratio of 1.6.

Claims 2-20 are in condition for allowance for at least their dependence on an allowable claim 1, as well as for the separately patentable subject matter that each of these claims recites.

If the Examiner believes an interview may be helpful in any way in the prosecution of this application, the undersigned is available at the telephone number set forth below.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Application No. 10/554,701
Response dated March 16, 2009
After Final Office Action of December 22, 2008

Docket No.: 12810-00159-US1

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 22-0185, under Order No. 12810-00159-US1 from which the undersigned is authorized to draw.

Dated: March 16, 2009

Respectfully submitted,

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